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ABSTRACT

This study attempts to determine the relative power of six factors that might influence decisions of teachers about the content of fourth-grade mathematics: district tests, mandated textbooks, the principal's opinion, and parents' opinions. Sixty-six teachers were presented with descriptions of hypothetical school districts constructed to provide systematic variations in the presence or absence of these pressures. Teachers indicated general willingness to add topics but reluctance to delete topics. For addition of topics, district tests and objectives had significantly greater effect than other factors. (Author/JD)

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RESPONSES TO CURRICULUM PRESSURES: A POLICY-CAPTURING STUDY OF TEACHER DECISIONS ABOUT CONTENT

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Teachers' thoughts and decisions are the focus of studies currently under way at Michigan State University's Institute for Research on Teaching (IRT). The IRT was founded in April 1976 with a $3.6 million grant from the National Institute of Education. That grant has since been renewed, extending IRT's work through September 1981. Funding is also received from other agencies and foundations. The Institute has major projects investigating teacher decision-making, including studies of reading diagnosis and remediation, classroom management strategies, instruction in the areas of language arts, reading, and mathematics, teacher education, teacher planning, effects of external pressures on teachers' decisions, socio-cultural factors, and teachers' perceptions of student affect. Researchers from many different disciplines cooperate in IRT research. In addition, public school teachers work at IRT as half-time collaborators in research, helping to design and plan studies, collect data, and analyze results. The Institute publishes research reports, conference proceedings, occasional papers, and a free quarterly newsletter for practitioners. For more information or to be placed on the IRT mailing list please write to : The IRT Editor, 252 Erickson, MSU, East Lansing, Michigan 48824.

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Abstract

Teacher decisions about the content to be covered have a strong effect on student achievement. This study attempts to determine the relative power of six factors that might influence decisions about the content of fourth-grade mathematics: district tests, mandated textbooks, district instructional objectives, other teachers' opinions, the principal's opinions, and parents' opinions. Sixty-six teachers were presented with descriptions of hypothetical school districts constructed to provide systematic variation in the presence or absence of these pressures. Teacher responses to questions about consequent addition and deletion of topics were analyzed to estimate the effect of each factor. Teachers indicated general willingness to add topics, but reluctance to delete topics. For addition of topics, district tests and objectives had significantly greater effects than other factors ($p<.05$).

RESPONSES TO CURRICULUM PRESSURES:

A POLICY CAPTURING STUDY OF TEACHER DECISIONS ABOUT CONTENT

Robert E. Floden, Andrew C. Porter, William H. Schmidt,

Donald J. Freeman, and John R. Schwille[1]

The importance of opportunity to learn has been recognized at least since Carroll's (1963) seminal model of school learning and has continued to occupy a central position in more recent models (Harnischfeger & Wiley, 1976; Cooley & Lohnes, 1976). Recent studies have found a strong relationship between opportunity to learn and student achievement (Inkeles, 1977). Since teachers have the final say on the content presented to pupils, teacher decisions about what content to present probably have a substantial effect on the pattern of student achievement. Hence, greater understanding of teacher decisions about content should contribute greatly to knowledge about the sources of differences in achievement.

Many recent studies have focused on teacher decision making in other areas (Anderson, 1977; Shavelson, 1976; Shavelson, Cadwell, & Izu, 1977; Shulman & Elstein, 1975; Yinger, Note 1). But no published studies have considered teacher's content decisions. The policy-capturing study reported here is one of a series of interrelated studies, which focus on factors that influence teacher's selection of instructional content (See Porter, Schwille, Floden, Freeman, Knappen, Kuhs, & Schmidt, Note 2). It explores

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[1]Robert E. Floden, William H. Schmidt, Donald J. Freeman, and John R. Schwille are senior researchers with IRT's Content Determinants Project. Andrew C. Porter is coordinator of that project. Therese Kuhs provided valuable comments on an earlier version of this paper. Suwatana Sookpokakit did the bulk of the data processing.

teacher's perceived responses to curriculum pressures by analyzing responses to descriptions in which combinations of pressures are systematically varied. It focuses on the content of fourth-grade mathematics.

Teacher decisions about fourth-grade mathematics content may be influenced by the actions of other individuals in the educational system, as well as by the teacher's own beliefs about mathematics (Schwille, Porter, & Gant, 1980). Some individuals may make a conscious effort to affect teacher content decisions, as when a district curriculum director promotes the use of a list of objectives to be achieved by fourth graders. In other cases, the impact on content decisions may be unintended. For example, a district superintendent may mandate administration of a standardized test to assess teacher effectiveness. Teachers may tend to restrict instruction to topics on the test--"teaching to the test"--although the superintendent had not desired such a shift in content coverage (Floden, Porter, Schmidt, & Freeman, 1980). The extent to which teachers respond to these various pressures to alter content has not previously been studied.

External pressures may cause teachers to add new topics, but they may also cause them to omit topics they had included in previous years. Topics may be dropped because they are squeezed out by new topics, or because the topics are specifically singled out as unimportant for students at a particular grade level. Work with the English measurement system might, for example, be dropped as the teacher notices that the metric system predominates on achievement tests and in textbooks. Since mathematics is primarily learned in school, mathematics achievement may be especially sensitive to teacher decisions to omit topics; an omitted mathematics topic may never be learned.

Teacher decisions are probably also influenced by the characteristics of the topics under consideration. Teachers may, for example, avoid topics that they have difficulty teaching, or topics that are not part of the traditional curriculum. Some teachers may wish to introduce topics that are just making their way into the elementary school (e.g., transformational geometry) enjoying the feeling of being part of the vanguard of curricular change. Other teachers may introduce topics because they are associated with "fun" activities.

One commonly used approach to the investigation of human decision making is policy capturing. Subjects are presented with a series of stimulus situations and asked to make a judgment or decision about each situation. The stimulus situations are each scored on one or more variables. These variables are used as independent variables in regression analyses to predict the subject's judgment. To the extent that the prediction is accurate, the resulting regression equations are taken to represent, or "capture" the "policy" that the subject used in arriving at the judgments.

When artificial stimuli are used in a policy-capturing study, results may not give an accurate picture of decision making in real-life situations. This disadvantage is balanced by benefits obtained by the investigator's control over the construction of the situations. A range of variation may be created, wider than could be easily found in a natural environment. Factors of particular interest may be balanced so that the effects of different factors can be clearly separated. In natural settings, factors are often highly correlated, prohibiting such clean separation.

One way of exposing subjects to stimuli is to ask them to read descriptions of an object, event, or situation. Such descriptions are called vignettes. A set of vignettes may be supplemented by additional descriptive material pertaining to all the vignettes.

Method

Subjects

The subjects for this study were recruited through five of the Michigan State University Student Teaching Centers, located throughout Michigan. The request for volunteers specified that the teachers should teach fourth graders mathematics, and indicated that each participating teacher would receive an honorarium. Of the 66 teachers who took part in the study, 19 were male and 47 were female.

The number of years of elementary-school teaching experience the teachers had ranged from 1 to 42, with a mean of 12. The number of years experience they had of teaching fourth graders ranged from 0 to 35, with a mean of 6.3. Most teachers (41 of 66) had taught third-, fourth-, or fifth-grade mathematics in only a single school system. All but three of the others had worked in two (16 of 66) or three (6 of 66) systems. The teachers ranged from 23 to 64 years of age, with a mean age of 38. More than half of the teachers had completed a masters degree.

The teachers in the sample were favorably inclined toward teaching elementary school mathematics. When asked to rank four school subjects (language arts including reading, mathematics, social studies, and science) according to the degree to which they enjoy teaching the subject to their current class, 37 of the teachers ranked mathematics first,

and 26 ranked it second. The subject receiving the next highest ranking was language arts, with 25 firsts and 22 seconds. The other two subjects got only a total of 22 first and second place rankings between them.

The schools in which these teachers currently worked included both urban, suburban, and small-town or rural schools. The teachers indicated that the parents of their students tended not to be college graduates (only 14 teachers reported that more than half of the parents were college graduates) and generally held low-income positions (40 teachers reported that more than half of the children were from low-income families).

Treatment Variables

The vignettes presented were descriptions of elementary schools. The teachers were asked to imagine that they had moved and had found a new job in the school described. Their new school was much like their old school, except that most of the students in their new class were assumed to be capable of doing fourth-grade work in mathematics. In addition, the new school had certain characteristics described by the vignette.

Each vignette described a certain combination of pressures to alter the content of mathematics instruction. In each case, the pressure was to add five new topics, and to omit five topics that the teacher had ordinarily covered. The meaning of "topics" was clarified by telling the teachers that they probably taught between 30 and 60 topics during the year, including both review and new material. Eight examples of topics were also given: adding fractions to whole numbers, finding the area of geometric figures, dividing by single digit numbers with no remainder, adding simple Roman numerals, working story problems involv-

ing multiplication of single-digit numbers, computing averages, expressing three digit numbers in expanded form to show place values, and converting fractions to decimals. These topics were selected from the cells of a taxonomy for classification of mathematics content developed at the Institute for Research on Teaching (Kuhs, Schmidt, Porter, Floden, Freeman, & Schwille, Note 3).

The pressures to teach "new" topics were always consistent in a vignette. That is, if examination of a test suggested that the teacher should present five "new" topics, and conversations with the principal also suggested five "new" topics, the new topics were the same in both cases (See Figure 1).

Six external pressures were varied when constructing the vignettes. Three of them were impersonal pressures: textbooks supplied to your class, publication by the central administration of a set of objectives which all teachers have been directed to follow, and publication in the local newspaper of standardized test results by building and grade level. The remaining three pressures came from personal interactions that revealed an individual's or group's content preferences: discussions with the principal, the fifth- and sixth-grade teachers, or the parents of children in your class.

The presence or absence of each of the six factors leads to 64 possible combinations of pressures. Because no description could be written to represent the absence of all pressures, only 63 vignettes were prepared. Only minor wording changes were allowed in the presentation of the pressure. In addition, the vignettes varied on irrelevant characteristics such as the name of the school and the

In the Tillatoba school district, the central administration has published, for fourth grade mathematics, a set of objectives which all teachers have been directed to follow. At the end of the year, a standardized test in mathematics is administered in each grade. The test results for each school are published, by grade level, in the local newspaper.

Shortly after your arrival in Tillatoba, you study the set of objectives. You examine the fourth grade test. You also look at the textbooks supplied your class. You find that, in all three cases, the materials include five topics that you have not previously taught to fourth graders and omit five topics that you have been used to teaching in fourth grade.

You also find that the parents of students in your classroom as well as the teachers and principal in your school take a particular interest in mathematics. Before school begins, Principal Lundberg asks you to the office to discuss curriculum matters. During the early weeks of school, the fifth and sixth grade teachers express their concerns about mathematics both at staff meetings and informally in the lunch room and teachers' lounge. The parents, for their part, raise many questions at the fall open house. In pursuing these discussions, you find that all these parties think you should teach five topics you have not previously taught in the fourth grade and at the same time question the value of teaching fourth graders five topics you have been used to teaching. The topics in each case are the same as those singled out by your examination of materials.

Figure 1. Sample vignette including all pressures.

principal.

Dependent Variables

A subject's projected reaction to the situation in a vignette was measured by four questions asked after each description. Two of the four questions asked the teacher whether s/he would teach the five "new" topics. One of those two indicated that the topics were usually covered in fourth grade, while the other indicated that the topics were seldom taught in elementary school. For brevity we refer to "core topics", and "peripheral topics," respectively. The other two questions asked whether the teacher would continue to teach the five "old" topics omitted by each of the sources of pressure. One of these "omit" questions referred to topics that the teacher judged to be of equal importance to the core topics, while the other referred to topics judged of equal importance to the peripheral topics. The teacher responded to each question on a seven-point Likert-type scale, on which "1" was "virtually certain to teach these topics", "4" was "uncertain", and "7" was "virtually certain *not* to teach these topics" (See Figure 2).

Design and Procedures

The six vignettes were divided into two balanced[2] half-replicates of 32 and 31 vignettes. Teachers were arbitrarily assigned to one or the other half of the design by assigning every other teacher at the first experimental session to one half. Thus, within each session, half of the teachers received descriptions from one half-replicate, and the remainder got vignettes from the other half.

Responses were collected in two sessions one week apart. The vignettes were randomly divided between the two sessions, so that, within

[2]The omission of a vignette describing total absence of pressure produced a slight imbalance in one half-replicate.

A. Assume that, among school systems in general, the five "new" topics are usually covered in fourth grade but, in your former school, they were covered in fifth grade. In light of the description on the opposite page (see Figure 1), would you teach the five new topics?

1. Virtually certain to teach these topics
2. Fairly certain to teach these topics
3. More inclined to teach these topics than not
4. Uncertain
5. More inclined not to teach these topics than to teach them
6. Fairly certain not to teach these topics
7. Virtually certain not to teach these topics

B. Further assume that you judge the five "old" topics to be of equal importance to the five "new" commonly covered topics. Given your response to Question A, would you continue to teach the five "old" topics?

1. Virtually certain
2. Fairly certain
3. More inclined to
4. Uncertain
5. More inclined not to
6. Fairly certain not
7. Virtually certain not

C. Now assume that, among school systems in general, although a few fourth grade teachers teach the five "new" topics, these "new" topics are not commonly taught at the elementary school level. In light of the description on the opposite page, would you teach the five "new" topics?

1. Virtually certain
2. Fairly certain
3. More inclined to
4. Uncertain
5. More inclined not to
6. Fairly certain not
7. Virtually certain not

D. Further assume that you judge the five "old" topics to be of equal importance to the five not commonly covered "new" topics. Given your responses to Question C, would you continue to teach the five "old" topics?

1. Virtually certain
2. Fairly certain
3. More inclined to
4. Uncertain
5. More inclined not to
6. Fairly certain not
7. Virtually certain not

Figure 2. Questions answered with reference to each vignette. (The response forms shown for Question A were used for the first two vignettes presented. The shorter forms were used for the remaining vignettes.)

a half-replicate, all teachers responded to the same set of vignettes on a given night. Each teacher, however, was presented with the vignettes in a different random order. Thus, the effects of the order of presentation can be separated from the effects of the vignettes presented. Each teacher also responded to questions about him/herself and about the school in which s/he taught.

Data Analysis

A primary intent of this study was to estimate the effects of the pressures present in a vignette on responses to each of the four questions about changing content. By assuming that third- and fourth-order interaction effects were negligible, we were able to estimate the main effects associated with each factor and the interactions between pairs of factors. Since the second-order interactions were confounded with each other, we could not estimate them.

Because each teacher responded to a set of vignettes balanced with respect to the six pressures,[3] the main effects and first order interactions can be estimated for each teacher. That is, 66 different equations can be estimated for predicting responses from pressures present -- one equation for each teacher. In this paper, however, we focus on the average effects of the pressures across the entire sample of teachers. An average effect can be thought of as the mean of the 66 effect estimates -- one estimate for each teacher. For this particular study design, the average effect is computationally equivalent to the effect of the pressure computed from the entire set of observations, ignoring the grouping of observations into 66 sets.

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[3]Because the no-pressure combination was not used, the balancing was not perfect in one half replicate. The resultant correlation among factors was, however, negligible.

We considered three related analyses of the main effects of the pressures. First, we compared the responses to the vignettes containing only a single pressure. How do teacher responses to the sole presence of published test scores compare to the responses to the sole presence of pressure from a principal? If there were no interaction effects, this comparison of single factor vignettes provided an unbiased estimate of the main effects of each pressure.

Second, we compared the main effects in a manner that emphasizes the fact that each individual teacher has a separate set of estimated main effects. For every individual, we determined which estimated main effects were significantly different from zero. By counting the number of individuals with a significant coefficient, the pattern of significant effects across the sample could be determined.

Finally, we considered the mean main effects computed from the entire set of data. We determined which effects were different from zero and how the effects compared in magnitude. In testing for significance, we took differences among teachers as the appropriate error term. First-order interaction terms were also estimated using the entire data set.

Initial analyses indicated that, though each of the pressures had an impact on teacher responses, differences among the measured effects of pressures were often small. A prediction model using number of pressures present as the independent variable thus seemed a reasonable simplification. Because of a ceiling effect also found, an exponential rather than linear model was employed. Using the exponential model, we estimated responses for no pressures and for a very large number of pressures. A graph of mean responses against number of pressures is presented for each of the four questions.

Results

To see whether data from the two half-replicates could be pooled, we computed a three way (groups x subjects, groups x measures) mixed-model analysis of variance for repeated-measure data, using a conservative number of degrees of freedom (Greenhouse & Geisser, 1959). For each of the four questions there was a significant (alpha =.05) difference between the two groups of subjects. However, no significant interactions were found between groups (half-replicate) and measures (pressures) for any of the questions. Examination of the estimates for each half-replicate showed, in fact, that for each question the order of strength of the six pressures was identical in the two half-replicates (e.g., if tests was the most powerful pressure for a question in one half-replicate, it was also most powerful for that question in the other half-replicate). The difference between the two groups was in the general magnitude of coefficients -- coefficients were always larger in the replicate with fewer pressures per vignette. This may well be due to the ceiling effect -- the presence of two pressures may have brought subjects so close to the scale end-point that the range of responses was sharply restricted. In the analyses, the two half-replicates are pooled, and emphasis is given to comparisons among the pressures, rather than to interpretation of the estimated regression coefficients.

Adding Core Topics

The mean responses to adding core topics (Figure 2, Question A) for each of the vignettes containing a single pressure are displayed in the first column of Table 1. A value close to 1 indicates that the teachers

Table 1.

Responses to Vignette Containing a Single Pressure

Mean (S.E.M.) \ Q	Add Core Topics A	Omit Core Topics B	Add Peripheral Topics C	Omit Peripheral Topics D
Text	2.49 (0.29)	2.42 (0.25)	3.73 (0.30)	2.39 (0.22)
Obj.	1.67 (0.19)	3.06 (0.27)	2.27 (0.25)	3.03 (0.25)
Test	2.06 (0.24)	2.73 (0.28)	2.64 (0.28)	2.91 (0.27)
Prin.	2.49 (0.25)	2.61 (0.25)	3.36 (0.31)	2.67 (0.23)
Par.	2.73 (0.24)	2.39 (0.22)	3.52 (0.28)	2.33 (0.21)
Tch.	2.52 (0.24)	2.67 (0.22)	3.36 (0.25)	2.88 (0.22)

N=33

were, on the average, "virtually certain" that they would add the additional topics. Values close to 3 indicate that the teachers were only more inclined to add the topics than not to add them (See Figure 2). That is, low numerical values can be interpreted as a strong effect of the pressure; high values indicate a lesser effect. Objectives seem to have had the strongest effect, followed by tests, and then text, principal, teachers, and parents.

The number of teachers with a given effect different from zero at the .05 level is given in the first column of Table 2. This analysis, admittedly crude, highlights the power of published test scores and objectives in influencing teacher responses. In this analysis, text moves to last place.

Table 2.

Number of Teachers with Significant Regression Weight ($\alpha = .05$)

	Add Core Topics QA	Omit Core Topics QB	Add Peripheral Topics QC	Omit Peripheral Topics QD
Text	4	11	5	9
Obj.	22	18	26	15
Test	26	21	25	17
Prin.	7	15	11	12
Par.	11	11	10	13
Tch.	6	9	4	7

N = 66

The whole-sample estimates of the effects of the six pressures are given in Table 3. All effects are negative, indicating that the addition of each pressure pushed the teacher's response in the direction of greater likelihood of adding the five topics. The greater the absolute value of the effect, the more powerful the pressure.[4] In this analysis, the ranking runs again from test and objectives down to text. All the effects are significantly different from zero at the .001 level.

Table 3.

Regression Weights For Each Pressure

Pressure \ Question	Add Core Topics A	Omit Core Topics B	Add Peripheral Topics C	Omit Peripheral Topics D
Text	-.059 (.104)	.131 (.209)	-.078 (.116)	.125 (.222)
Obj.	-.147 (.178)	.200 (.242)	-.211 (.219)	.152 (.249)
Test	-.178 (.278)	.178 (.236)	-.235 (.325)	.185 (.216)
Prin.	-.095 (.122)	.161 (.229)	-.137 (.136)	.133 (.218)
Par.	-.112 (.160)	.080 (.225)	-.118 (.176)	.066 (.206)
Tch.	-.077 (.160)	.113 (.189)	-.078 (.156)	.100 (.138)

N = 66

As indicated earlier, repeated measures analysis of variance with conservative degrees of freedom was computed using the effects of pressures as dependent variables. To specify significant pair contrasts among the

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[4] The dummy variable used in the regression analysis was coded +1 for presence of a pressure, and -1 for absence. Hence, the effect on the response scale of adding a pressure is twice the numerical value given in Table 3.

six pressures, a Scheffe post hoc procedure was used, keeping the conservative estimate of degress of freedom. These post hoc comparisons show that, at an overall alpha level of .05, the only significant difference among the effects is that between texts and district tests.

An omnibus test of the vector of the 15 first-order interaction terms showed the vector to be significantly different from the zero vector at the .05 level. The estimates of the interaction effects for the first question are given in the first column of Table 4. Asterisks mark the interactions significantly different from zero at the .05 level. Note that only seven of the 15 interactions were significantly different from zero. All the significant interactions involved the two most powerful pressures, test and objectives. These interactions may reflect a ceiling effect that becomes prominent when these powerful pressures push responses close to the end of the scale.

A large amount of the variation in responses to this question is accounted for by differences in the teachers' general willingness to add core topics, as measured by their mean response across all 32 vignettes. This general willingness accounts for 37% of the total variation in response to this question.

In Figure 3, the relationship between number of pressures in a vignette and the mean response is presented graphically. The graph for adding core topics is the downward-tending solid line. The mean responses are averages across teachers and across all vignettes with the specified number of pressures.[5]

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[5]In this study, one set of 33 teachers received only vignettes with one, three, or five pressures, the remaining teachers received vignettes with two, four, or six pressures. Hence, the points on the graph represent two different samples, with alternating points estimated from the same sample. Note that the number of observations on which the data points are based also varies; 20 vignettes contain three pressures, while only one has six pressures.

Table 4.

Interaction Regression Weights: Mean (S.E.M.)

Q Term	Add Core Topics A	Omit Core Topics B+	Add Peripheral Topics C	Omit Pheripheral Topics D+
AB	.060* (.015)	-.018 (.018)	.048* (.018)	-.009 (.016)
AC	-.005 (.015)	.003 (.016)	.027 (.014)	-.003 (.016)
AD	.019 (.014)	.004 (.017)	.011 (.015)	-.009 (.014)
AE	-.003 (.009)	.017 (.017)	-.020 (.014)	.003 (.017)
AF	-.008 (.012)	-.043 (.019)	-.015 (.014)	-.002 (.020)
BC	.088* (.014)	-.071 (.020)	.118* (.017)	-.051 (.021)
BD	.056* (.012)	-.014 (.021)	.052* (.014)	-.011 (.018)
BE	.024* (.010)	-.014 (.020)	.027 (.017)	-.025 (.017)
BF	.037* (.012)	-.034 (.014)	.014 (.016)	-.062 (.017)
CD	.032* (.011)	-.021 (.018)	.057* (.015)	-.027 (.017)
CE	.048* (.016)	-.021 (.022)	.033* (.016)	-.002 (.019)
CF	-.000 (.013)	-.009 (.015)	-.002 (.014)	-.020 (.015)
DE	-.011 (.014)	.011 (.021)	-.007 (.018)	.020 (.019)
DF	.015 (.013)	-.022 (.020)	.009 (.013)	-.023 (.020)
EF	-.006 (.017)	.022 (.015)	.020 (.016)	.008 (.018)

+ omnibus test not significant at .05

N = 66

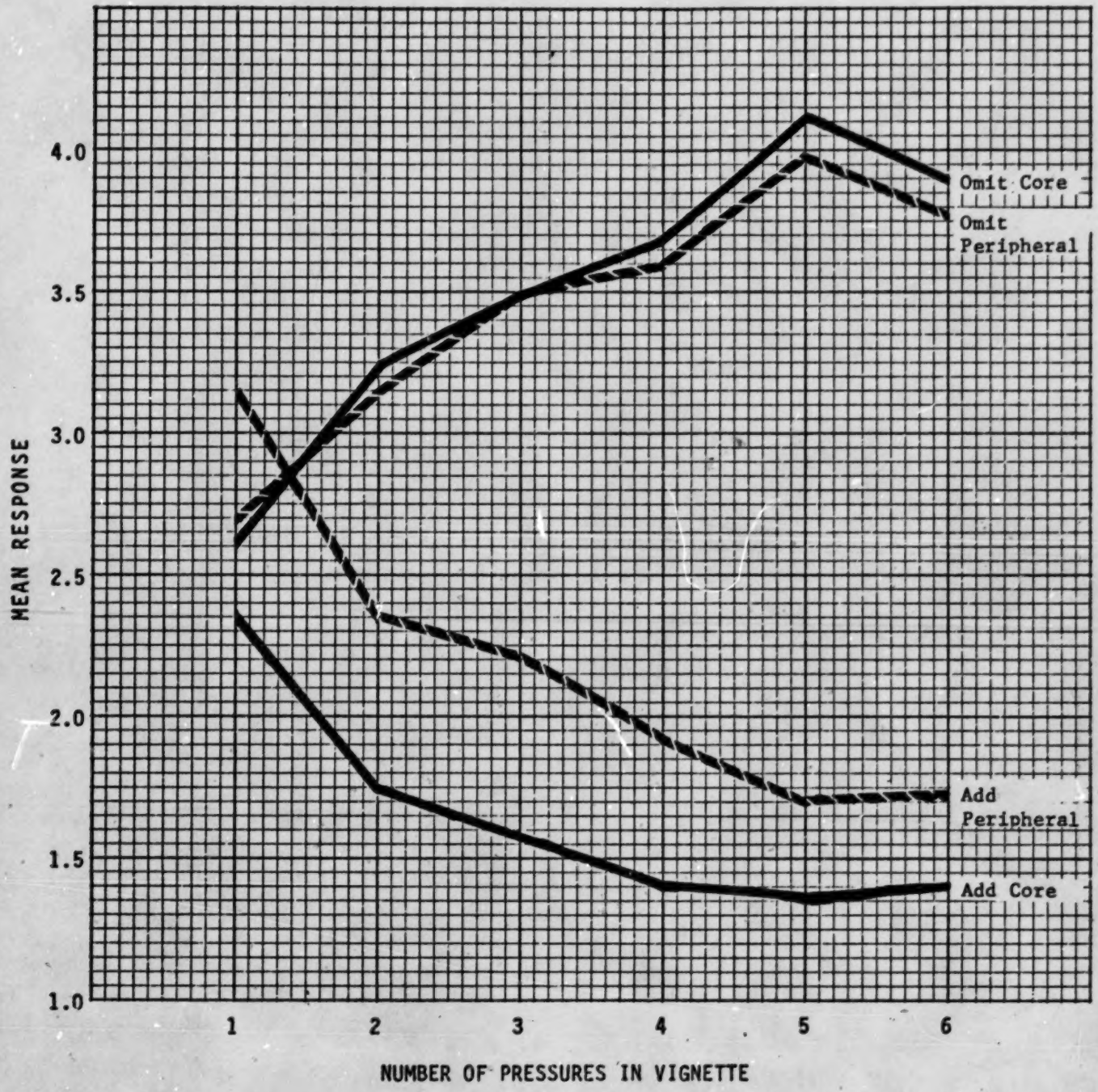

Figure 3. Relationship between mean response and number of pressures (by question).

As expected, the curve is roughly monotonic and reaches an asymptote as the limit of the scale is approached. For each sample, the curve is strictly monotonic--the signle discrepant data point is estimated from a different sample than its neighbors. The curve appears to be expotential, approaching an asymptote near, but not at, the upper limit of the scale.

A three parameter exponential model was fitted from the entire data set. Using the model, the response with no pressure was estimated to be 2.69. The asymptote, or the response expected with a large number of pressures, was 1.01. The model accounts for an additional 10% of the variation in responses.

The response with no pressures is somewhat difficult to interpret. Recall that such a vignette was omitted from the design because the questions asked make little sense in the absence of all pressures for change. The zero pressure response might be thought of as representing the teachers' willingness to add new topics that come to their attention. The estimated response of 2.69 would then indicate that teachers see themselves as quite likely to add new topics.

Interpretation of the asymptote is much easier. As pressures are added, the effect of each succeeding pressure diminishes. Teachers approach, rather rapidly in this case, the point beyond which no external pressure can push them. For some, indeed many teachers, this point is fixed by the limits of the response scale. For other teachers, the limit is somewhat short of the end of the scale. For adding core topics, that limit is quite close to the end of the scale; given sufficient pressure, almost every teacher would respond that they were "virtually certain" to add the five new topics.

Omitting Core Topics

Recall that the teachers were also asked to assume that the five "old" topics referred to in the vignette were as important as the five "new" topics. A second question (See Figure 2, Question B) asks whether the teachers would continue to teach the five "old" topics. In a sense, the vignette describes pressures for omitting these topics. When text, test, or objectives are present, they do not cover the "old" topics; when the vignette describes conversations with teachers, parents, or principal, the vignette indicates that the value of the "old" topics for fourth graders have been questioned. The teacher usually teaches the "old" topics, so omitting them is a change in that teacher's practice.

For vignettes with only a single pressure present, the mean responses on omitting core topics are given in the second column of Table 1. For this question, a score close to 1 indicates that the teacher would continue to teach the topic (i.e., the pressure had little effect). A score close to 7 indicates that the teachers would drop the topic (i.e., the pressure had a great effect) (see Figure 2). Since the highest mean for a single pressure vignette is approximately 3, it is apparent that a single pressure did not have a very large effect on the decision to teach the "old" topics. In terms of relative effects, the responses are similar to those for adding core topics, in that objectives and test were the most influential pressures. A post hoc comparison of these means showed that they do not significantly differ from one another when the overall alpha level is held to .05.

Using the indicator of number of teachers with a regression coefficient significant at the .05 level, objectives and test again appear to be the most powerful pressures, although the differences

among pressures are not as striking as they were for adding core topics. The results of this analysis are given in the second column of Table 2.

This initial pattern is repeated in the estimates of the main effects using the entire set of data. Objectives and test appear to be the strongest pressures, but the gap between these pressures and the next highest is not as large as it was for adding core topics (see Table 3). Also, while the test was the most powerful factor in causing the teachers to add topics, objectives was most powerful in causing them to omit core topics. Furthermore, the textbook was no longer at the bottom of the list. While all effects are more than two standard errors from zero, an omnibus test shows no significant differences among these effects.

The estimated interaction effects for omitting core topics are presented in the second column of Table 4. An omnibus test revealed that the vector of interactions was not significantly different from the zero vector at the .05 level.

Since there are no significant differences between any of the six different pressures, it is particularly appropriate to consider the general effects of the number of pressures present. As with adding core topics, the responses to omitting core topics were graphed against the number of pressures present, and an exponential model was fitted to the data.

The graph for omitting core topics is presented as the upward tending solid line in Figure 3. As expected, teachers perceived likelihood of continuing to teach the old topics decreased as pressure to teach other topics mounted. Deviations from a consistent upward trend may again be attributable to the different samples of teachers involved -- teachers in

one sample seeing vignettes with one, three, or five pressures, those in the other sample seeing vignettes with two, four, or six pressures. Within a sample, the mean response increases with each increase in number of pressures.

Using a fitted expotential model, the responses expected for no pressures and a very large number of pressures can be computed. With no pressures present, a response of 2.55 is expected. The model had no asymtote; the expected response continues to increase as the number of pressures increases. For this question, the teacher mean response accounts for 61% of the variance. Number of pressures accounts for an additional 5%.

Linkages between responses to these core topics are also of potential interest. One might expect that the addition of new topics would lead to the omission of some old topics, keeping the total number of topics covered approximately equal. Such a replacement phenomena would produce a negative correlation between responses to the two questions--as a teacher is more likely to teach the "new" topics, the teacher would be less likely to continue to teach the "old." In the presence of a large number of pressures, one would expect the teacher to be virtually certain to omit the "old" topics (since they indicate they would be virtually certain to add the "new.")

The correlation between responses to the two questions was computed for each teacher. The mean of these correlations across the 66 teachers was -.319. While this indicates that there is some tendency to drop old topics as new ones are added, the potency of this phenomenon is only moderate. Teachers seemed hesitant to give up old topics even when adding new ones. Hesitancy is even more apparent when one examines

the mean responses to the two questions, holding the number of pressures constant (see Figure 3). With all six pressures present, for example, the teachers are, on an average, fairly to vitually certain to add the new topics, but uncertain whether they will continue to teach the old topics. If new topics were replacing old, one would have expected the teachers to indicate that they were fairly to virtually certain *not* to continue to teach the old topics.

Peripheral topics

The questions about peripheral topics (see Figure 2, Questions C and D) run parallel to the questions about core topics. By comparison with core topic questions, the following results reveal the influence of the type of topic on teachers' responses.

Mean responses to peripheral topic questions for vignettes with a single pressure present are displayed in the last two columns of Table 1. Once again, objectives and test are most likely to increase a teacher's willingness to add new topics. But for every pressure, the mean response is higher for adding peripheral topics than for adding core topics, indicating that teachers thought themselves less likely to add these peripheral than core topics. The mean responses to omitting peripheral topics were virtually identical to those for omitting core topics.

Whether the old topic was core or peripheral made no difference when the topic was something that the teacher was under pressure to delete.

For questions about peripheral topics the effects of the pressures computed from the entire data set are presented in the last two columns

of Table 3. For the question on adding topics, the pattern of responses is similar to that for core topics, with objectives and test standing out as the strongest pressures. A post hoc comparison of differences between the effects revealed that the differences were more sharply drawn than they were for core topics. At an overall alpha level of .05, the only significant difference for adding core topics was between the strongest effect, test, and the weakest, texts. Using the same overall alpha level for adding peripheral topics, the pressures divided clearly into two groups, with test and objectives as the stronger set and the remaining pressures as the weaker. With only one exception (objectives vs. principal), every difference between a pressure in the strong set and a pressure in the weak set was significant. However, no differences within a set (e.g., between test and objectives) were significant. A possible explanation of the greater number of significant differences for adding peripheral topics is that the ceiling effect was not so strong.

For omitting peripheral topics, objectives and test were again the most powerful pressures. In contrast to core topics, test was more powerful than objectives, though this difference was not significant in the post hoc comparison. While no post hoc differences were significant for omitting core topics, three differences were significant for omitting peripheral topics. Test and objectives were both more powerful than parents, and test was also more powerful than teachers.

The interaction regression weights for peripheral topics are presented in the last two columns of Table 4. For adding topics, the vector of interactions was significantly different from the zero vector at the .05 level. As was the case with core topics, all significant interactions involved one of the two powerful main effects, again

suggesting that the interactions resulted from a ceiling effect. As was the case for omitting core topics, the vector of interactions for omitting peripheral topics was not significantly different from zero at the .05 level.

The graphs of responses for peripheral topics are also plotted against the total number of pressures present in a vignette. In Figure 3, the downward-sloping dotted line is the graph for adding topics and the upward-sloping dotted line is the graph for omitting topics. The curve for adding peripheral topics parallels that for adding core topics, but is shifted upwards. This is consistent with the results for the single vignettes--teachers were less willing to add peripheral topics. Computing estimates as before, in the absence of all pressures, the expected no pressure response for adding peripheral topics was 3.47 (contrasted with 2.69 for adding core topics). The asymptote was estimated to be 1.27 (contrasted with 1.01). Given a sufficient number of pressures, teachers still will think themselves quite likely to add the new topics, but the asymptote is *not* at the extreme end of the scale. Apparently, some teachers felt they might never add the peripheral topics. The graph for omitting peripheral topics virtually coincides with that for omitting core topics. As the number of pressures increased, teachers saw themselves as less and less likely to continue to teach the five old topics.

Discussion

These results can be interpreted in at least two different ways.

First, one can take the results as a first, imperfect approximation of the effects of the pressures on teacher content decisions. Despite the well known disparity between what people do and what they say, society could hardly continue if people did not often do as they said they would.

One should not be so naive as to think that a projected response perfectly mirrors actual behavior. But neither should one be so cynical as to consider expressed prediction as unrelated to future actions. Though acceptance of self-reports is certainly problematic, the extreme behaviorist dismissal of self-reports seems unwarranted. Self-reports at least serve as imperfect indicators until further studies can be undertaken.

Second, one weakness of self-report can be turned to advantage in interpreting these results. A natural tendency in describing one's own actions is to give the socially acceptable response. Thus, these teacher projections can be thought of as descriptions of what behaviors the teachers believe to be socially acceptable. If teachers think that it is most acceptable to follow the advice of parents (at least with regard to instructional content), then they should tend to distort their "true" response so as to exaggerate the influence of parents.

Perhaps the most striking result, whichever interpretation is taken, is the degree to which teachers see themselves going along with whatever pressures are administered. Even with only a single pressure present, teachers, on the average, project that they would be fairly certain to teach requested topics. Given current emphases on the professionalism of teachers and their authority in the classroom, this is surprising, whether it means that teachers actually are that malleable, or that teachers think malleability is the socially acceptable image.

It is also interesting to note how reluctant teachers seem to be regarding the omission of topics. Do teachers think that the additional topics would be included by expanding the time alloted for mathematics

(perhaps at the expense of elementary school science), or by covering all topics in somewhat less depth? Again, this apparent resistance could also reflect teachers' belief that it is not socially acceptable to meet new teaching demands by abandoning old ones. The National Education Association (NEA) suggests that teacher "burn out" is partially attributable to such an attitude regarding teaching tasks as a whole.

The low coefficients for pressure from textbooks was particularly notable. Prior to the study, conversations with teachers and researchers had suggested that many teachers base their instruction firmly on the text they use. That would seem to indicate that text would be the strongest influence on teacher content decisions, rather than one of the weakest.

One explanation of this result rests on the fact that few teachers teach everything in the textbook. Even teachers who use the text as the primary guide for instruction seldom complete the text by the end of the school year. If, for example, the five new topics were all at the end of the textbook, the strictly textbook-bound teacher would have to make a special effort to include them, rather than being under pressure to add them. This explanation is consistent with the result that, in the post hoc comparison of coefficients, textbooks are not significantly different from tests and objectives in the questions about omitting topics.

The strength of the pressure from tests is also striking, though perhaps not surprising. If this response is taken as a prediction of actual behavior, it confirms the fears of many that teachers will tend to teach to the test used. Due to teachers' general resistance to dropping

topics, however, fears that only tested topics will be taught should be somewhat eased.

The greater resistance to adding peripheral than core topics was expected. Given the exact wording of the two questions we asked, the fact that the difference isn't even larger is another reflection of teacher malleability (or teacher perception that cooperation is the most acceptable pattern of behavior). One question indicated that the five "new" topics are universally covered in either fourth or fifth grade; all that was asked of the teacher was that the topics be covered in fourth grade. When one also considers that in school systems in general, the topics are usually covered in fourth grade, and that the introduction to the vignettes specified that the children in the hypothetical classroom were capable of doing fourth-grade work, it seems as if *any* resistance to change is evidence of rather firm convictions about the teacher's responsibility for chosing content.

In contrast, another question says that the five new topics are not generally taught anywhere in elementary school. This might have suggested that the topics will be unfamiliar to the teacher, and perhaps that students will have a difficult time with the material. Yet the difference in mean response between adding peripheral and adding core topics was only about one point on the seven-point scale (see Figure 3). The teachers seemed strongly inclined to add peripheral topics despite possible extra preparation and difficulties in instruction. Apparently, teachers are either willing to delegate responsibility for content selection to others, or at least to think that such delegation is socially acceptable.

Obviously, this study gives only initial hints regarding the factors influencing teacher content decisions. Further work must both check these self-reports against actual teacher behavior, and begin to include other possible important features of the teaching situation, such as the teacher's perception of students' ability and prior achievement.

Other factors to be considered include teacher characteristics, the teacher's role in district content decisions, and the part played by subject-matter specialists outside the district. Some teacher characteristics, such as years of experience and degree level, were included in the current study, but no systematic relationship with decision policies was found.

A final important consideration is the consistency among the various pressures. In this study, all factors were said to be pressing for the same sets of topics. Preliminary examination of texts and tests indicates that most combinations of test and text will give inconsistent messages regarding what should be taught. How will teachers make their decisions when the district objectives conflict with the district-wide achievement test?

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